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DanBred Nutrient Specifications

Introduction

These nutrient specifications are a guideline for composing, optimizing and adjusting feed and feeding levels for DanBred genetics and can facilitate the balance between optimal body condition and the reproductive performance as well as minimize an environmental impact from excretions.

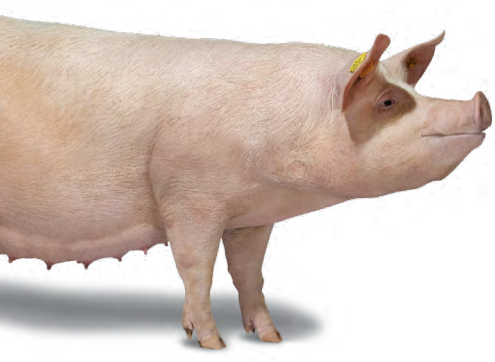
The recommendations are based on ongoing trials and results made in association with the Danish Pig Research Centre, SEGES, combined with on-farm results gained from the collaboration with ADDCON, BIOMIN and VILOMIX Denmark.

Careful attention to feed and feeding levels for DanBred genetics will set a prime starting point on the road to release the genetic potential for consistently high lifetime productivity.

For questions on requirements specific to your location please contact the DanBred Technical Services Team for obtaining the accurate information.

DanBred Partner Service
Service@danbred.com
+45 45 4488 1188

Content



Basics nutritional requirements of pigs

The feed must cover the nutritional requirements of the pigs for maintenance, production of meat and milk as well as foetal development. On top of this, the feeding should be a part of securing the health and welfare of the pig together with the economy of the producer.

The feed costs in any production system is the largest component of the expenses. Feed conversion and daily gain are some of the decisive factors whether considering if the production to be cost-effective or not. Therefore, it is crucial to control the feeding strategies, the content of nutrients in the balanced feed and the feed hygiene in the herd. Also, to ensure the maximum utilization of the genetic potential of the hyper prolific modern bred.

Nutrient supply

The main factors to consider when designing a nutrition program is the total energy provided by the feed levels of protein, amino acids, carbohydrates and fat. Carbohydrates provide the body with energy and can be converted into body fat. They can consist of monosaccharides (e.g. glucose), disaccharides (e.g. sucrose and lactose), oligosaccharides (e.g. lupins, soybeans and peas), and polysaccharides (e.g. cellulose and starch).

Fats provide energy in a more concentrated form than carbohydrates and can also be converted into body fat. Like carbohydrates, fats are compounds of carbon, hydrogen and oxygen and store most of the animals' energy reserves. Tallow and vegetable oils are the most common fats added to pig diets- some polyunsaturated fatty acids (e.g. n-3 and n-6 types) are essential for pig growth.

All proteins are compounds of carbon, hydrogen, oxygen and nitrogen. Proteins are an essential part of cells, where they regulate life processes, provide structures as well as being needed for the body’s growth and repair. Proteins consist of chains of amino acid units, and how the amino acid units are linked gives each protein its characteristic properties.

If producers know the relationship between energy intake and lean muscle growth for pigs of different age or sizes, they can predict how energy intake affects growth and composition and use this information profitably. The capacity for growing pigs to deposit lean meat is greater than their ability to consume energy. This means that they can be offered ad libitum access to high energy diets without excessive fat or a drop in feed conversion efficiency. The more energy a pig consumes, the faster it will grow assuming the diet is adequately supplied with balanced protein.

In the slaughter pig, energy intake may exceed the requirement for maximum lean protein deposition, and the pig may begin to lay down proportionally more fat (relative to lean). This tends to be a greater problem in females and castrates than in entire males.

Eating behaviour and appetite regulation

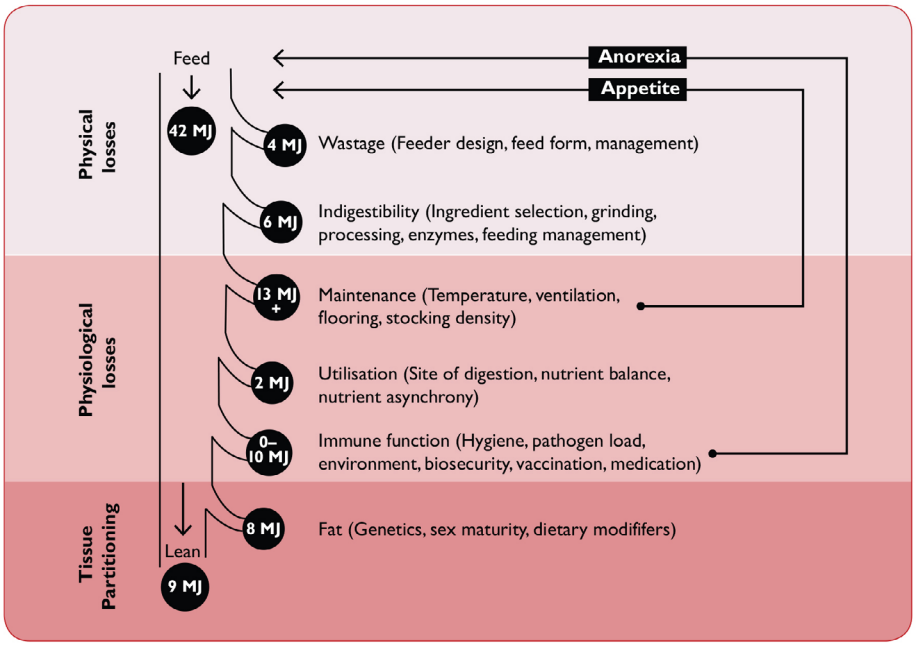
Pigs are very social animals and prefer to eat together. They use a lot of time to search for feed in their natural environment and generally, they are very motivated to eat and drink.

Until the weight of 50-60 kg, the feed intake is physically regulated. This means it is the capacity of the digestive tract that determines how much they eat. After 60 kg it is to a greater extent metabolically regulated, which means that it is the content of nutrients in the blood and filling of the gut regulating the feed intake. Pigs with a high genetic ability to metabolise the feed can eat more before the chemical regulation reduce the feed intake.

Gut capacity limits the amount of feed a growing pig can eat, so voluntary energy intake of a pig weighing under 60kg depends on the diet's energy concentration.

Understanding the digestion of the pig

The key to efficient pork production is minimising the maintenance energy requirement of the pig so that they can maximise the use of the nutrients provided to them. However, as demonstrated in the table below, the majority of the nutrients are used by the pig to support their immune and metabolic demands. Outside of these requirements, nutrients can be used for fat and lean tissue growth.



The potential losses of energy occurring in a finisher pig consuming 42MJ of gross. Modified from ACE Livestock Consulting Pty Ltd, 2011

The presence and ratio of all the necessary nutrients in the animal's diet is very important. Nutrients are required to meet the basic animal needs, growth, metabolic and immune processes, and additional needs like reproductive abilities such as milk secretion in sows, foetal development, etc. It is normal to have some nutrient losses, but it is very important to minimize the same.

One way of nutrient and energy losses that an animal receives from a diet is to maintain a balance between good and harmful bacteria in the digestive tract, i.e. maintaining the normal gut microbiome of the animal. Currently, these losses have not been defined in sows, but for piglets, for example, there is evidence suggesting that up to 25% protein and up to 20% energy from a diet is required to maintain a normal balance between good and harmful bacteria in the gut. From this example, these nutrient and energy losses are not negligible and should be minimized.

By using organic acids in the diet of the sow, we can successfully control the number of harmful bacteria in the gut, which can significantly reduce these losses in nutrients and energy, giving a sow more opportunity to use them for other purposes.

High quality feed ingredients

DanBred animals come with an extraordinary genetic potential for reproductive performance. High-quality feed ingredients as well as monitoring the physical and nutrient standards of the ingredients whether purchased or home grown is fundamental to the drive for consistent performance and in setting a prime starting point on the road to release the genetic potential high lifetime productivity.

The energy and nutrient content of the ingredients used might differ from region to region why it is important to always have updated analyses of the ingredients going into the diet formulation. Careful attention to the type and quality of the ingredients going into the herd is an advantage when aiming for excellence.

This paper specifies the optimal nutrient requirements of DanBred sows and gilts and represents the nutritional level which the feed should reach regardless of ingredients and raw materials.

Adjusting raw feed ingredients

It is important to remember to adjust the raw feed ingredients gradually, so that the pigs are weaned onto the new feed without changing the taste or consistency too severely. Changing the raw ingredients too much or too often will result in a decrease in feed intake in any stage of pig production, and will therefore result in a loss of production.

Frequent changes in diet, type of feed and feed ingredients in pigs can lead to various problems. This represents one big stress for these animals in general and it is mainly reflected to poorer appetite, bad digestion of nutrients and also alteration of the gut microbiome in the animals themselves, which can cause health and production problems.

Organic acids (as for example KDF, traded as FORMI®, ADDCON) in the diet of sows, piglets and slaughter pigs, contribute to a better appetite, stabilization and better digestion of nutrients when changing feed (better digestion of proteins and fats), as well as better utilization of minerals such as Calcium and Phosphorus. This is best seen in the weaning period, when the piglets are changing from the sows milk to solid feed.

Health and production problems can be seen in the period of feed changing, caused by the increased development of pathogenic microflora (e.g. E. Coli). Organic acids with their bactericidal and bacteriostatic effect control the pathogen microflora in intestine and improve the conditions for the commensal microflora of the animal, which also contributes better digestion of new feeds, better health status and better production parameters.

Toxins

Mycotoxins are found in most raw feed materials worldwide, and can have a direct and negative effect on reproductive performance in pigs. Mitigating these effects is therefore essential in high performing pig units.

Mould and their Mycotoxins, yeast and endotoxins are naturally occurring contaminants and are among the most immune suppressive factors coming from feed. The toxins are invisible, odourless and cannot be detected by smell or taste, but can impair animal health and immune status and will significantly reduce pig performance.

Mycotoxins are known anti-nutritional factors that affect reproduction. Over 400 different mycotoxins have been identified to date, with the most well-known being trichothecenes, zearalenone (ZEN), ochratoxins, aflatoxins, fumonisins and ergot alkaloids. Raw materials can be affected by more than one fungus, and each fungus can produce more than one mycotoxin- so there is a high chance that there is more than one mycotoxin in any feed ingredient.

In order to reduce the negative effects of toxins it is important to test feed ingredients regularly. Toxin binders such as Mycofix® Plus (Biomin) can be added to the feed- DanBred recommends to always consult professionals before administering any additives.

Feed preservation with liquid organic acids products (Addcon XL 2.0) and organic acids salts (Addcon XF Superfine) can reduce the number of fungi, mould, yeasts, and pathogenic bacteria, and also lower the production of unwanted substances.

Physical properties of raw ingredients

Grain processing and subsequent particle size is one of the biggest factors affecting the efficiency of the pigs use of grains and diets. The correct adjustment of particle size can affect feed efficiency, however, if the particle size is too small the incidence of stomach ulcers can increase which greatly affects the performance of the sow.

There are three main ways in which grain is milled- roller, hammer and disc mills. Roller mills consist of two rollers which rotate towards each other, where the fineness to which the grain is processed can be adjusted by roller speed, shape and flutings. Hammer mills consist of many free swinging strips of metal, acting as hammers, that are attached to a heavy duty drive shaft turning at about 300rpm.

Screens with varying sizes of holes determine how long the grain is kept in contact with the hammer, and subsequently how fine the grain is milled. Disc mills operate on the grinding action of two discs or plates. Grain is ground between the discs which can be adjusted to the desired particle size. The disc mill has the capacity to pre-set grinding options to suit various classes of animals, e.g. a finer particle size for weaner pigs, and a coarser structure for slaughter or breeding animals.

Fibre

Dietary fibre, usually defined as the indigestible portion derived from plants, forms a key component of many pig diets.

The physiological properties of different fibres are related primarily to their solubility, viscosity, physical structure and water-holding capacity, rather than their constituent monomers.

Typically, dietary fibres have been categorised as either soluble fibres, which are fermented in the colon to produce gases and physiologically active by-products. Insoluble fibres which are metabolically inert which can decrease the risk of constipation in sows- this, in turn, helps the sow when farrowing.

Thus, including fibre to the diet promotes normal physiological functions in the digestive tract. Inclusion of soluble non-starch polysaccharides (NSP) in the diet can stimulate the growth of commensal gut microbes, suggesting that fibre can have prebiotic effects in pigs due to interactions with the gut micro-environment and the gut associated immune system. The inclusion of organic acids in the diet can stimulate the growth of commensal gut microbes.

The increased fermentative capacity of sows makes diets high in dietary fibre more suitable for sows than growing pigs because these diets can be used to control energy intake and hunger at the same time and the sows can utilise energy from the fibre, whereas growing pigs could be limited in their growth when fed too much fibre.

Fibres in the feed have shown a positive effect on milk yield and piglet growth in the lactating sow. The fibre source is important if milk production should be improved.

Gut health

Optimal gut health is crucial for optimal performance of the highly productive DanBred sow. Her longevity is dependent on optimal gut health in the early feeding of gilts, so that stomach ulcer development can be avoided. Gut health basically means a balance between good and bad microflora inside the intestine- if the balance favours bad microflora, this can lead to different health and production problems.

Some good examples of fibre content and their source are:

- Sugar beet pulp, lucerne pellets, oats, wheat bran, soy bean hulls.
- Barley is preferred as the primary grain component.
- The structure of the grain component in the diet is required to be semi rough ground as a minimum.

This feed structure can be achieved by following the sieve profile guide below:

	Below 1 mm	1-2 mm	2-3 mm
Composition (grain part)	50%	35%	15%

Health of legs, feet and hooves

Toes that are slightly longer than normal will eventually impact the sows' gait when walking. Sows experience heel overgrowth and erosion when there are cracks and overgrowth and/or erosion in the soft heel tissue or cracks in the claw wall.

Toes that are slightly longer than normal will eventually impact the sows' gait when walking. Sows experience heel overgrowth and erosion when there are cracks and overgrowth and/or erosion in the soft heel tissue or cracks in the claw wall. Although of course the environment in which they are housed in plays a factor, many of these foot lesions are caused by a nutritional deficiency or imbalance, and can be prevented by feeding the correct amount of the trace minerals- copper (Cu), zinc (Zn) and manganese (Mn) which are required by the sow.

- Manganese is essential for healthy joints, tendons and overall bone density.
- Zinc has a healing effect on wounds, and contributes to the renewal of epithelial (skin) cells. A deficiency can cause cracks to the hoof.
- Copper is needed for strong connective tissue and white line health.
- Zinc and copper are also are crucial in a sow's diet for sole, heel and nail strength and elasticity.

Biotin is a water soluble B Vitamin that helps the body convert into energy. It is also particularly important for the health of hair, skin and nails (together with Omega 3 fatty acids). Biotins function is similar to the mortar in a brick wall, while the brick quality is depended on the micro minerals. Shortage of any of the component result in weak hoof nails.

Organic acid salts such as calcium propionate, calcium formate, sodium benzoate (available as Addcon XF Superfine) can be an additional source of minerals for the pigs. Dissociated organic acids in the digestive tract of the animal together with minerals are creating a new compound (chelates), an easier form for animals to absorb and use minerals. An additional positive effect of using organic acids (KDF, traded as FORMI® by ADDCON) is a reduced ammonia level in the animal facilities, due to better digestion of proteins and utilisation of nitrogen.

The optimal supply of nutrients to the dermis supports the formation of strong and resistant claw horns. The addition of organically bound trace elements, such as Biomin® LocoMote, can help to improve the horn tissue.

Water

Water is the single most important nutrient in any animals diet, however, its' importance is often overlooked. About 75% of lean meat is water, and for all body functions to occur, water needs to be present in sufficient amounts for the processes to be carried out correctly- this includes the deposition of protein for muscle (lean meat).

Water consumption is closely linked to feed intake in any production phase- if pigs cannot drink enough then they will eat less.

Water supply

The pigs' need for water varies according to the time of year, the climate in the stable and health status. If the pig is in bad health, the need for water can rise to double of normal. e.g. feeding grain with a high content of toxins. However, as a general rule, pigs consumer 2-3 times more water than feed.

There should always be free access to clean, cool water and the animals need for water increases concurrently with the intake of feed. Gestating and lactating sows need for water is extraordinarily large due to foetal development and subsequent milk production.

One drinker can supply water to 10-15 pigs under normal conditions. The drinkers can be a nipple, bite or bowl, and at least two should be placed in the pen in case of blockage and also to avoid aggression between pen mates over one drinker. They should be placed at least 60cm apart, and the height needs to be adjusted to suit the size and weight of the pigs. If a water trough is being used, it is recommended that a length of at least 300mm is provided for 20 slaughters pigs.

Water supply – Water cup and water nipple.

Pigs must always have free access to fresh water. Although until 14 days of age, most of the piglets fluid needs are provided by the sows milk, it is still important that they learn to drink

Check of water supply

It is important to check the flow rate every time a new group of animals enters the pen.
The flow rate from the nipple must be 0.5 – 0.8 litres/ minute for piglets, 0.8 – 2 litres/ minute for slaughter pigs and minimum 4 litres/ minute for sows.

The daily water requirements for animals is dependent on their environment and climatic condition. In in tropic or subtropic climate (>30°C) the pigs have a greater water requirement that pigs keept in temperate climate (15°C).

The following table indicates the average water requirements for pigs in each stage of production.

Animal group	Litres per day
Suckling pigs	1 – 2
Piglets	1 – 5
Growers, 15 – 45 kg	4 – 8
Finishers, 45 – 100 kg	6 – 10
Gestating sows	12 – 20
Lactating sows	35 – 50
Boars	8 – 10

For questions on requirements specific to your location please contact DanBred Techanical Services Team for accurate information.

Water hygiene

It is extremely important to regularly disinfect the water system and remove any biofilm from the water pipes- as biofilm could be teeming with infectious bacteria.

- Empty and rinse the water system twice with an approved disinfectant and flush at least once with clean water.
  - Carry out the first rinse after washing the surface of the water nipples or drinkers
  - Complete the second rinse the day before the animals arrive and not before.
- Let the cleaning product soak in for about 5 hours.
- Make sure the water system is rinsed with clean water at least once before the animal arrives.

Water quality

Like drinking water for human consumption, drinking water for pigs must be physically, chemically and microbiologically correct. It is important to know what the quality of water is being offered to the pigs is as this impacts multiple factors of production including the pig's water intake, the impact on the water delivery system (scale build up can cause blockages), as well as the effect of delivery of nutrients and medications in the water.

Water for pigs should be of the same quality as water for human consumption. It is recomended to test water sources four times per year. The following table provides the basic recommendations of the normal quality composition of water.

	Good	Take action
pH	5.5–8.5	< 4 or > 9
Ammonium (mg/l)	< 1.0	> 2.0
Nitrite (mg/l)	< 0.10	> 1.00
Nitrate (mg/l)	< 25	> 100
Chloride (mg/l)	< 250	> 1,000
Sodium (mg/l)	< 400	> 800
Sulphate (mg/l)	< 100	> 250
Iron (mg/l)	< 0.5	> 10.0
Manganese (mg/l)	< 1.0	> 2.0
Hardness (ppm)	< 60	> 300
Coliforms (cfu/ml)	< 100	> 100
Total bacterial count (cfu/ml)	< 100,000	> 100,000

cfu = colony-forming units.

Nutrient tables for DanBred sows and gilts

DanBred Gilts

Energy. per kg feed	Gilts 30-110 kg	Gilts 30-65 kg	Gilts 65-110 kg	Gilts > 110 kg
MJ ME/kg feed	12.5	12.6	12.5	12.5
MJ NE/kg feed	9.5	9.7	9.5	9.5
Danish feed units (FU)sow/kg	1.05	1.06	1.05	1.05
The relation between MJ ME/MJ NE are dependant of the raw materials.				

Amino acids. (digestible)	Gilts 30-110 kg	Gilts 30-65 kg	Gilts 65-110 kg	Gilts > 110 kg
SID protein. min. g/kg	105	125	105	100
Lysine. SID g/kg	6.3	8.2	5.3	4.2
Methionine. % of SID lysin	31	31	31	31
Met + cys. % of SID lysin	58	58	65	65
Threonine. % of SID lysin	65	65	72	72
Tryptophan. % of SID lysin	20	20	20	20
Isoleucine. % of SID lysin	56	56	60	60
Leucine. % of SID lysin	108	108	102	102
Histidine. % of SID lysin	36	36	35	35
Phenylalanine. % of SID lysin	55	55	58	58
Phenylalanine + tyrosine. % of SID lysin	113	113	102	102
Valine. % of SID lysin	69	69	74	74

Macro minerals. g/kg	Gilts 30-110 kg	Gilts 30-65 kg	Gilts 65-110 kg	Gilts > 110 kg
Calcium without phytase	7.7	8.5	7.8	7.1
Calcium 60-100 % phytase	7.2	8.0	6.8	6.9
Calcium 150-250 % phytase	6.9	7.7	6.5	6.3
Calcium 300-400 % phytase	6.7	7.5	6.3	6.1
Total phosphorus. minimum (100% phytase)	4.9	5.5	4.5	4.0
Total phosphorus. minimum (200% phytase)	4.5	5.2	4.1	3.6
Total phosphorus. minimum (300% phytase)	4.2	5.0	3.9	3.5
Total phosphorus. minimum (400% phytase)	4.1	4.9	3.8	3.4
Digestible phosphorus	2.6	3.2	2.4	2.1
Sodium*	2.0	2.0	2.0	2.0
Magnesium*	2.0	2.0	2.0	2.0

DanBred Gilts

Micro minerals. mg/kg. minimum * **	Gilts 30-110 kg	Gilts 30-65 kg	Gilts 65-110 kg	Gilts > 110 kg
Fe	85	85	85	85
Cu	15	15	15	15
Mn	43	43	43	43
Zn	106	106	106	106
I	0.25	0.25	0.25	0.25
Se	0.25	0.25	0.25	0.25

Vitamins *	Gilts 30-110 kg	Gilts 30-65 kg	Gilts 65-110 kg	Gilts > 110 kg
A vitamin. 1000 IU/kg	10	10	10	10
D3 vitamin. 1000 IU/kg	1.0	1.0	1.0	1.0
E vitamin. mg/kg	43	43	43	43
K3 vitamin. mg/kg	4.0	4.0	4.0	4.0
B1 vitamin. mg/kg	2.1	2.1	2.1	2.1
B2 vitamin. mg/kg	2.1	5.2	5.2	5.2
B6 vitamin. mg/kg	3.2	3.2	3.2	3.2
B12 vitamin. mg/kg	0.03	0.03	0.03	0.03
Biotin. mg/kg	0.22	0.22	0.22	0.22
Folic acid. mg/kg				1.6
Niacin. mg/kg	21.4	21.4	21.4	21.4
Pantothenic acid. mg/kg	11	11	11	15.3

Additional vitamins and additives ***	Gilts 30-110 kg	Gilts 30-65 kg	Gilts 65-110 kg	Gilts > 110 kg
C vitamin mg/kg	200	200	200	200
Betaine. mg/kg				300
DHA Omega-3. g/tons				
Choline chloride. mg/kg	added	added	added	added
Antioxidant. mg/kg	added	added	added	added
Toxin binder. g/tons	added			

* Recommendations could be different from the tables between EU, SEA and Eastern Europe countries due to local regulations for some of the components with consideration of additional factors such as transport, climate, feed intake. environmental conditions and health status.

** Highly prolific sows have a higher demand for nutrients, using a part of micro mineral supplements in organic form, could be beneficial to reach optimum production.

*** This is not a demand, but a recommendation to reduce stress factors and ensure feed quality for example in case of stress and hot conditions.

Gestating & Lactating sows

Energy. per kg feed	Gestating sows	Lactating sows
MJ ME/kg feed	12.5	13.4
MJ NE/kg feed	9.5	10.1
Danish feed units (FU)sow/kg	1.02	1.13
The relation between MJ ME/MJ NE are dependant of the raw materials.		

Amino acids. (digestible)	Gestating sows	Lactating sows
SID protein. min. g/kg	100	125
Lysine. SID g/kg	4.2	8.4
Methionine. % of SID lysin	31	31
Met + cys. % of SID lysin	65	58
Threonine. % of SID lysin	72	65
Tryptophan. % of SID lysin	20	20
Isoleucine. % of SID lysin	60	56
Leucine. % of SID lysin	102	108
Histidine. % of SID lysin	35	36
Phenylalanine. % of SID lysin	58	55
Phenylalanine + tyrosine. % of SID lysin	102	113
Valine. % of SID lysin	74	69

Macro minerals. g/kg	Gestating sows	Lactating sows
Calcium without phytase	7.1	8.7
Calcium 60-100 % phytase	6.9	8.5
Calcium 150-250 % phytase	6.3	8.2
Calcium 300-400 % phytase	6.1	8.0
Total phosphorus. minimum (100% phytase)	4.8	5.8
Total phosphorus. minimum (200% phytase)	4.3	5.5
Total phosphorus. minimum (300% phytase)	4.2	5.4
Total phosphorus. minimum (400% phytase)	4.1	5.3
Digestible phosphorus	2.0	3.3
Sodium*	2.0	2.0
Magnesium*	2.0	2.0

Gestating & Lactating sows

Micro minerals. mg/kg. minimum * **	Gestating sows	Lactating sows
Fe	82	90
Cu	15	15
Mn	41	45
Zn	102	113
I	0.25	0.25
Se	0.25	0.25

Vitamins *	Gestating sows	Lactating sows
A vitamin. 1000 IU/kg	10	10
D3 vitamin. 1000 IU/kg	1.0	1.0
E vitamin. mg/kg	41	186.5
K3 vitamin. mg/kg	4.2	4.5
B1 vitamin. mg/kg	2.1	2.3
B2 vitamin. mg/kg	5.2	5.7
B6 vitamin. mg/kg	3.2	3.4
B12 vitamin. mg/kg	0.03	0.03
Biotin. mg/kg	0.5	0.5
Folic acid. mg/kg	2.0	2.0
Niacin. mg/kg	21.4	23.0
Pantothenic acid. mg/kg	15.3	17.0

Additional vitamins and additives ***	Gestating sows	Lactating sows
C vitamin mg/kg	added	added
Betaine. mg/kg	added	added
DHA Omega-3. g/tons	added	added
Choline chloride. mg/kg	added	added
Antioxidant. mg/kg	added	added
Toxin binder. g/tons	added	added

* Recommendations could be different from the tables between EU, SEA and Eastern Europe countries due to local regulations for some of the components with consideration of additional factors such as transport, climate, feed intake. environmental conditions and health status.

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DANBRED

Your business. Our DNA.

DanBred is one of the world's leading international pig breeding companies supplying genetics and service solutions.

DanBred has highly reliable breeding data and is the first pig breeding company in the world to use genomic information from all breeding candidates when calculating breeding index, which amounts to more than 100,000 animals per year.

DanBred sets long-term, balanced breeding goals, which are revised regularly. This ensures that the genetic progress for the DanBred Duroc, DanBred Landrace and DanBred Yorkshire breeds delivers maximum profit and creates a sustainable high investment return for our customers. See our breeding goals at www.danbred.com.

Well-documented genetics and comprehensive service solutions are the foundation of DanBred. This has made DanBred the first choice for leading pig producers all over the world who expect optimal, predictable business results.

DanBred P/S is owned by the Danish Agriculture and Food Council, Danish Agro and the former DanBred International A/S (now Holdingselskabet DBI A/S).

DanBred P/S I Head Office • Lyskær 3EF, 1st floor • DK-2730 Herlev I Branch Office • Drejervej 7 • DK-6600 Vejen I Tel +45 38 41 01 41 • danbred.com